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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/549,290	09/16/2005	Masaharu Hatano	050195-0546	1973

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MCDERMOTT WILL & EMERY LLP  
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WASHINGTON, DC 20005-3096

EXAMINER
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VIJAYAKUMAR, KALLAMBELLA M

ART UNIT	PAPER NUMBER
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1751

MAIL DATE	DELIVERY MODE
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08/10/2007

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

## Office Action Summary

Application No.

10/549,290

Applicant(s)

HATANO ET AL.

Examiner

Kallambella Vijayakumar

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 16 September 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1 and 3-12 is/are rejected.
- 7) ☒ Claim(s) 2 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 16 September 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- ☐ Notice of Informal Patent Application
- ☐ Other: \_\_\_\_\_

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***Detailed Action***

- This application is a 371 of PCT/JP04/03774 filed 03/19/2004. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d) over JP 2003-078066 filed 03/20/2003, which papers have been placed of record in the file.
- Claims 1-12 are currently pending with the application.
- The examiner has considered the IDS filed 09/16/2005.
- The listing of references in the specification is not a proper information disclosure statement. 37 CFR 1.98(b) requires a list of all patents, publications, or other information submitted for consideration by the Office, and MPEP § 609 A (1) states, "the list may not be incorporated into the specification but must be submitted in a separate paper." Therefore, unless the examiner has cited by the references on form PTO-892 and/or the applicant/s have cited them on PTO-1449, they have not been considered.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

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1. Claim 12 is rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Badwal et al (Solid State Ionics, 2000, V136-137, PP 91-99).

Badwal et al teach the composition a sintered cubic scandia-zirconia electrolyte containing about 9 mol% Sc<sub>2</sub>O<sub>3</sub>, its properties and a method of making it (Abstract, Pg-91, CI-2, Last line bridging Pg-91, CI-1, I-line). The prior art composition is either same or substantially same as that claimed by the applicants, and when the reference teaches a product that appears to be the same as the product set forth in a product-by-process claim although produced by a different process, the claim is not patentable. See *In re Marosi*, 710 F.2d 799, 218 USPQ 289 (Fed. Cir. 1983) And *In re Thorpe*, 777 F.2d 695, 227 USPQ 964 (Fed. Cir. 1985). See also MPEP §2113. All the limitations of the instant claims are met.

The reference is anticipatory.

In the alternative that the disclosure by Badwal et al be insufficient to arrive at the limitations of the instant claims by the applicants, it would have been obvious to a person of ordinary skilled in the art to optimize the elemental composition and/or the preparative conditions to arrive at the limitations of the instant claims with reasonable expectation of success, because the prior art is suggestive of these variations (Pg-92, Experimental, Table-1; Pg-96, Fig-6; Pg-98, Conclusion).

2. Claim 12 is rejected under 35 U.S.C. 102(b) as anticipated by Tanaka et al (US 4,328,296).

Tanaka et al teach the composition of a sintered cubic scandia-zirconia electrolyte containing about 6.5-7 mol% Sc<sub>2</sub>O<sub>3</sub>, its properties and a method of making it. The sintered composition contained less than about 5 wt% monoclinic phase and had particles with an average surface grain of less than 5 micron (Abstract, CI-1, Ln 65-CI,2, Ln 15; CI-4, Ln-8; Claims 1, 6, 7 and 9). The prior art composition is either same or substantially same as that claimed by the applicants, and when the reference teaches a product that appears to be the same as the product set forth in a product-by-process claim although produced by a different process, the claim is not patentable. See *In re Marosi*, 710 F.2d 799, 218 USPQ 289 (Fed. Cir. 1983) And *In re Thorpe*, 777 F.2d 695, 227 USPQ 964 (Fed. Cir. 1985). See also MPEP §2113. All the limitations of the instant claims are met. The reference is anticipatory.

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***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

1. Claims 1, 3-5 and 7-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Badwal et al (Solid State Ionics, 2000, V136-137, PP 91-99) in view of Takeuchi et al (J. Electrochemical Soc, 2002, 149(4), pp 455-461, Abstract).

Badwal et al teach the composition a sintered cubic scandia-zirconia electrolyte containing about 9 mol% Sc<sub>2</sub>O<sub>3</sub>, its properties and a method of making it (Abstract, Pg-91, Cl-2, Last line bridging Pg-91, Cl-1, I-line). The prior art teaches making the composition by calcining an uniaxially pressed bar (green body) containing the reactant powders, and further annealing the samples to attain stabilized resistivities

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as a function of temperature and stabilizer concentration (Pg-92, Experimental; Table-1; Pg-96, Table-2).

The prior art is also concerned about the density of the sintered product (Table-1).

The prior art is silent about/fails to teach sintering the solid electrolyte by spark-plasma machining per claim-1 and the heating and cooling parameters per claims 3-5 and 7-9.

In the analogous art, Takeuchi et al teach the benefits of spark-plasma sintering of a 8YSZ ceramic solid electrolyte in attaining 99% theoretical density at a lower sintering temperature and shorter duration, and further with improved conductivity (Abstract).

It would be obvious to a person of ordinary skilled in the art to combine the prior art teachings to substitute sintering method of Badwal et al with spark-plasma of Takeuchi et al as functional equivalent to benefit from improved density of the sintered oxide with reasonable expectation of success, because Badwal is concerned about the density of the electrolyte and the prior art teachings are in the analogous art of solid electrolytes based on zirconia, and the combined prior art is suggestive of the claimed method step. Further, the instant claimed limitation of less than 40 MPa encompasses a range of  $0 < (\text{MPa}) \leq 45$ , and Generally, differences in concentration, pressure or temperature will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such concentration, pressure or temperature is critical. "[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). The examiner notes the data in Tables 1-4, and they are not in commensurate with the scope of the claim. The cooling of the sample after calcinations under no load would be obvious to a person of ordinary skilled in the art.

With regard to claims 3-5, 9 and 11, the prior art teaches making the composition by sintering of the precursors at desired temperatures, and Generally, differences in concentration, particle size, pressure or temperature will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such concentration, particle size, pressure or temperature is critical. "[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). The examiner notes the data in Tables 1-4, and they are not in commensurate with the scope of

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the claim. With regard to annealing in claim-9, the prior art teaches attaining stabilized electrolyte by annealing and it would have been obvious to a person of ordinary skilled in the art to stabilize the properties of the composition by annealing it.

With regard to claims 7-8, the prior art teaches forming a perform and sintering the perform forming a sintered compact, and the Omission of an Element, and Its Function or an additional step by the prior art Is Obvious If the Function of the Element or the step Is Not Desired Ex parte Wu , 10 USPQ 2031 (Bd. Pat. App. & Inter. 1989) <MPEP 2144.04>

With regard to the claim-10, prior art teaches a cubic phase of the composition.

2. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Badwal et al (Solid State Ionics, 2000, V136-137, PP 91-99) in view of Takeuchi et al (J. Electrochemical Soc, 2002, 149(4), pp 455-461, Abstract) and Mazanec (US 6,019,885).

The combined prior art disclosure on the composition and making of the Scandia stabilized zirconia by Badwal et al in view of Takeuchi et al as set forth in rejection-1 under 35 USC 103(a) is herein incorporated.

The combined prior art fails to teach the process of making the composition from citrate precursors per the claim.

In the analogous art, Mazanec et al teach the composition of multicomponent solid electrolyte membranes containing perovskite structured yttria and Scandia stabilized zirconia and making the perovskite compositions from oxide precursors or nitrate and/or acetate precursors or citrate precursors (CI8, Ln 57-60; CI-13, Ln 31 to CI-14, Ln 32; Ln 56-60).

It would be obvious to a person of ordinary skilled in the art to combine the prior art teachings to make the Scandia stabilized zirconia electrolyte composition from citrate precursors as choice of design of the process of making the composition with reasonable expectation of success, because the genus of precursors of Manazec et al containing citrates, nitrates and oxides encompasses the species of nitrates of the elements of Badwal et al, and the combined prior art teaching is suggestive of the claimed method step.

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***Allowable Subject Matter***

Claim 2 objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The prior art of record neither teaches or suggestive of cooling the sintered oxide under a specific pressure range and applicants unexpected data in the Table on the effect of pressure on cooling obviates any obviousness of this limitation.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kallambella Vijayakumar whose telephone number is 571-272-1324. The examiner can normally be reached on 8.30-6.00 Mon-Thu, 8.30-5.00 Alt Fri.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Douglas McGinty can be reached on 571-272-1029. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/KMV/  
Aug 02, 2007.

  
DOUGLAS MCGINTY  
SUPERVISORY PATENT EXAMINER

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